

Research Projects

Summary of Step A of the Delfts Cluster Research Programme on Land Use in LCA

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This intermediate report attempts a first test of the method to assess land use impacts in life cycle assessment (LCA) according to a proposal from IVAM Environmental Research, University of Amsterdam (Lindeijer et al. 1998). After this first attempt, a more detailed research will follow for more specific data, acceptable methodological choices and, in phase 2 of this research programme, on a study how to incorporate deconstruction in this approach. The research programme is performed within the expert centres Delfts Cluster and CKM (a virtual chain management centre of TNO and CML). The main commissioner for phase 1 is the Dutch Ministry of Transport, Public Works and Water Management (RWS DWW) and the main contractants are TNO Industrial Technology (location Delft) and the Centre for Environmental Science (CML) in Leiden, both in the Netherlands.

Land use implies all human activities that are performed on or in the land surface, and which can impact the environment. Landscape impacts (scenery disturbances) and intersection impacts are not included, as they are very hard to match with the boundary conditions of a quantitative LCA.

The IVAM ER method for land use impacts has many limitations and uncertainties, but is nevertheless one of the most promising initiatives to assess the burden of land use in LCA. The other method is based on the PhD work of Thomas Köllner at ETH in Switzerland, applied in the Eco Indicator 99. The Eco-Indicator has only a few, non-specific scores for land use, due to which gross estimates have to be made for certain types of land use.

For both approaches it is still quite open how land use data should best be determined and presented. In any case, both occupation of land and land use changes should be taken into consideration. A location-specific assessment is in principle possible with the IVAM method, but would not seem in accordance with the range in land use data in the rest of a life cycle of a building material, for instance. Also, the biodiversity indicator used (plant species density) has limited botanical value, although it does give a first impression of what nature values are at stake, and where in the life cycle that is. The ambition of such a land use impact indicator should be no more than an order of magnitude assessment, in a global LCA.

Adjustments to the methodology are planned for this coming year (2001), within the current research programme.

In this first scanning (step A) the following conclusions were drawn. Land use data (especially land transformations) are hard to collect. For a generally accepted set of data considerable efforts have to be made in step B of this research programme. The data that are found in step A are in line with earlier data collected by IVAM ER. They all have lesser ranges than the original data, thanks to better statistics. Additionally, a procedure has been developed in this step to determine the land transformation per unit of output, and methodological question-marks are identified.

Both methods were applied to 2 cases of building components. This revealed that:

- Resource extraction contributes considerably to land use impacts of building components in the Netherlands
- the contribution of background data such as electricity production, industrial processes and transport are comparable to the contribution of resource extraction
- wood extraction has a separate position due to its extensive land use. The physical intervention is therefore large, but it depends on the assessment method whether this is compensated by the increase in European forest area or not
- methodological choices as the above can still determine the outcome of a comparison focussing on land use.

In step B the case of wood extraction will be studied further. Thanks to the Delfts Cluster research programme methodological issues can get adequate attention. Integration of three recent land use methods is now suggested. The priorities for data collection are now clear thanks to the 2 cases. For land transformation the determination of the difference in nature value before and after the land use is important.

Reference

- Lindeijer E et al. (1998): Biodiversity and life support indicators for land use in LCA, IVAM ER/IBN-DLO, DWW publication series Raw Materials nr. 1998/07, reportnr. W-DWW-98-059, RWS DWW Delft NL (tel. ++31-15-2518308)

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